Lab Exercise pt 1

SSEC Tech Camp

You will be using SIFT in this Lab to anticipate where convection will start in Kansas. You'll be using infrared imagery – infrared imagery is emitted by the Earth, modulated by the atmosphere, and detected by the satellite. You'll use that information to make a short-range forecast on this day:
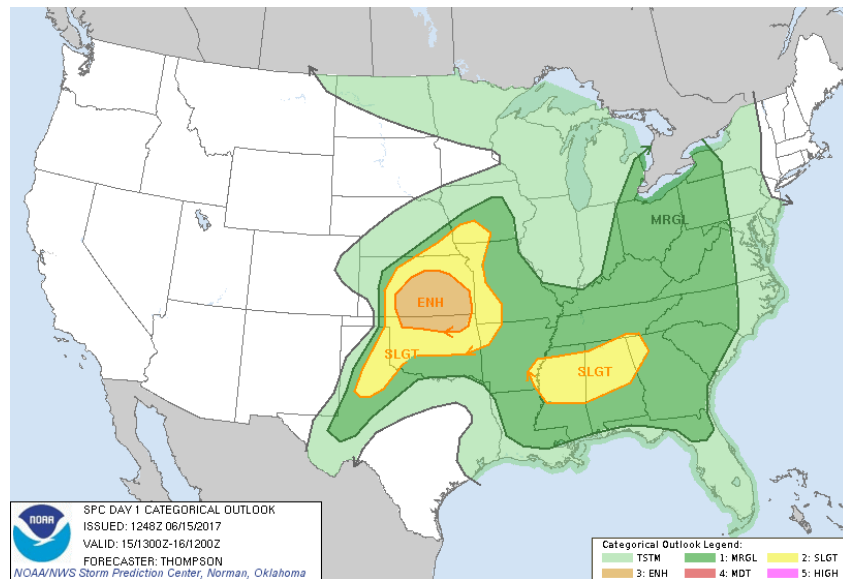

Figure 1: Day 1 Outlook from the Storm Prediction Center on the likelihood of severe weather. Issued: 1300 UTC on 15 June 2017.

After the lab you'll give a short presentation on your forecast, with justification. So – write down everything you're doing in this lab, and also write down the answers to any questions posed. You are working in a group. Have one person write down what's being done, one person can write down the answers to the questions you are asked in the lab, and one person can 'drive'. Rotate tasks, if you wish.

First, Launch SIFT, and then Load up the imagery ('Ctrl-O') on the computer. You will load up Bands 1, 13 and 15 (data at 0.47 μm, 10.3 μm and 12.3 μm, the 'Blue visible', 'Clean Window' and 'Dirty Window', respectively) from the GOES-16 Advanced Baseline Imagery (ABI). These data sit in the 'Preconvective' folder on the computer desktop. 12 files – 4 for each band, at 15:02, 15:07, 15:12 and 15:17 UTC on 15 June 2017. After the data have loaded, you can step forward/backward in time using the right/left arrow keys. You can switch bands being viewed using the up/down arrows. Use the roller wheel on the mouse to zoom into Kansas. Note how the 'Layers' window has populated, as well.

If you right click on a band in the layer, you will see a 'Change Colormap' opportunity. Find a colormap that you like. (For example, I like 'IR Color Clouds Summer') Why did you choose this one? Does it highlight something that you think is important? You can change value bounds as well. Does that help highlight important features?

A note: There are built-in enhancements in SIFT that have names – like Precipitable Water – that reflect what they were built for. If you color-enhance a single channel with an enhancement named 'Precipitable Water' – or some other variable like Lifted Index – you have not changed what you're looking at; it's still a brightness temperature (for infrared channels) or a reflectance (for visible/near-infrared channels).

Convection forms on boundaries, typically. Examine the visible imagery (Band 1 – 0.47 μm). Step forward and backward in time. Do you see any boundaries in the visible imagery? How about in the Band 13, 10.3 μm 'Clean Window' imagery?

The 'Split Window Difference' field is used to describe where moisture differences might exist. So you need to create a Split Window Difference field. To do that, find 'Create Algebraic' under 'Layer'. This pops up a window – you can name the field you're creating, let's just call it 'Split Window Difference'. Operation – you can leave that as Difference; 'x' should be B13 and 'y' should be B15. Once this is done, and you hit 'OK', all the possible fields will be created. You then need to change the default – right-click on the name in the 'Layers' and choose "Change Colormap" -- bounds (-164 to 164) to something more sensible (try -10 to 10) – and change the default enhancement (there's one called 'Dust and Moisture Split Window' that you might try).

Does the Split Window Difference have features in it that make you think that there's a focusing point or line for the convection to develop? As you answer this, consider that features will not move very far in the 3-hour window that you're looking at for convective development. Don't look at features over Arizona, for example, and expect them to move to Kansas in only 3 hours to initiate convection!

Before your presentation, make sure you write down the answers to all the questions in this document, and to call attention to features you think might (or might not) be important. Write down why you (and your group!) think things are happening.

During the presentation, you will be re-doing what you've done here. There are helpers around when you're doing this to help. Ask questions!